

Report for the year 2015 and future activities

SOLAS Taiwan

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Please note that this report has two parts!

Part 1: reporting of activities in the period of January 2015 – December 2015

Part 2: reporting on planned activities for 2016 to 2018/19.

*The information provided will be used for reporting, fundraising, networking and strategic development. In particular, **in 2016 SOLAS will develop its Implementation Plan, which will be largely based on the information from part 2 of the national reports, as well as input from international SOLAS initiatives and activities.** This info will be crucial in order to draft a realistic Implementation Plan representative of SOLAS, internationally.*

IMPORTANT: May we remind you that this report should reflect the efforts of the SOLAS community in the entire country you are representing (all universities, institutes, lab, units, groups)!

PART 1 - Activities from January 2015 to December 2015

1. Scientific highlight

Describe one scientific highlight with a title, text (max. 200 words), a figure with legend and full references. Please focus on a result that would not have happened without SOLAS, and we are most interested in international collaboration.

Dissolved organic nitrogen in wet deposition of the southern East China Sea:

In 2015, air pollution problem has become a big issue in the Northeast Asia, because of the accelerated economic development, high levels of urbanization, restructuring of the agricultural industry, thriving industrial industry, and increased use of fossil fuels. From January 2012 until June 2013, 78 rainwater samples were collected over an 18-month period and were analyzed to examine the total dissolved nitrogen (TDN), dissolved inorganic nitrogen (DIN), dissolved organic nitrogen (DON) and major ions in the rainwater. The concentrations of dissolved nitrogen species observed in the research area between November 2012 and April 2013 were relatively high, whereas those observed between May 2013 and October 2012 were relatively low. The patterns of changes over time were similar to those of non-sea-salt (nss) ions. The amounts of DIN and DON accounted for $63 \pm 5\%$ and $37 \pm 5\%$ of the TDN, respectively, and the percentage of the DIN was higher during the spring and winter. The concentrations of low molecular weight – DON (LMW-DON) and high molecular weight – DON (HMW-DON), which accounted for $84 \pm 3\%$ and $16 \pm 3\%$ of the DON, respectively, were both high in the winter and low in the summer. The percentage of LMW-DON increased in the summer, possibly because of the numerous oceanic air masses and typhoons. Regarding the wet deposition fluxes (Table 1), the DIN ($197 \pm 10.27 \text{ mmolm}^{-2} \text{ yr}^{-1}$) and DON ($129 \pm 6.82 \text{ mmolm}^{-2} \text{ yr}^{-1}$) accounted for approximately 64% and 36% of the TDN, respectively, and the LMW-DON ($108 \pm 5.97 \text{ mmolm}^{-2} \text{ yr}^{-1}$) and HMW-DON ($19 \pm 1.02 \text{ mmolm}^{-2} \text{ yr}^{-1}$) accounted for 85% and 15% of the DON, respectively. The wet deposition flux of the nitrogen species observed in the

research area was $332 \pm 16.0 \text{ mmolm}^{-2} \text{ yr}^{-1}$, and the total flux (dry and wet deposition) was approximately $393.4 \pm 25.2 \text{ mmolm}^{-2} \text{ yr}^{-1}$ ($5508 \pm 353 \text{ mg N m}^{-2} \text{ yr}^{-1}$).

References:

Chen, Y.X., Chen, H.Y., Wang, W., Yeh, J.X., Chou, W.C., Gong, G.C., Tsai, F.J., Huang, S.J., Lin, C.T. (2015), Dissolved organic nitrogen in wet deposition in a coastal city (Keelung) of the southern East China Sea: Origin, molecular composition and flux, *Atmospheric Environment*, 112, 20-31.

Table 1. Annual fluxes of various nitrogen species in dry and wet deposition ($\text{mmol m}^{-2} \text{ yr}^{-1}$)

| | TN | ON | LMW-ON | HMW-ON | IN |
|-----------------------|-----------|------------|----------|---------|------------|
| Dissolved | 327±9.89 | 127±6.06 | 108±5.97 | 19±1.02 | 200±7.81 |
| Water-soluble* | 61.4±19.5 | 22.2 ± 8.8 | 11.2±3 | 11±4.6 | 39.2 ±17.4 |

2. Activities/main accomplishments in 2015 (projects, field campaigns, events, model and data intercomparisons, capacity building, international collaborations, contributions to int. assessments such as IPCC, interactions with policy makers or socio-economics circles, etc.)

A joint research project of three-year (2013-2015) between Taiwan and Russia has been conducting to compare the carbonate system and pertinent chemical hydrography between the East China Sea and the Sea of Japan.

3. Top 5 publications in 2015 (only PUBLISHED articles) and if any weblinks to models, datasets, products, etc.

For journal articles please follow the proposed format:

Author list (surname and initials, one space but no full stops between initials), year of publication, article title, full title of journal (italics), volume, page numbers, DOI.

1. Chen, Y.X., Chen, H.Y., Wang, W., Yeh, J.X., Chou, W.C., Gong, G.C., Tsai, F.J., Huang, S.J., Lin, C.T. (2015), Dissolved organic nitrogen in wet deposition in a coastal city (Keelung) of the southern East China Sea: Origin, molecular composition and flux, *Atmospheric Environment*, 112, 20-31.
2. Chou, W.C., Gong, G.C., Hsieh, P.S., Chang, M.H., Chen, H.Y., Yang, C.Y., Syu, R.W. (2015), Potential impacts of effluent from accelerated weathering of limestone on seawater carbon chemistry: A case study for the Hoping power plant in northeastern Taiwan, *Marine Chemistry*, 168, 27-36.
3. Tsai, A.Y., Gong, G.C., Hu, S.L., Chao, C.F. (2015), The effect of grazing and viral lysis on the diel variations of *Synechococcus* spp. abundance in the East China Sea, *Estuarine Coastal and Shelf Science*, 163, 108-115.
4. Tsai, A.Y., Gong, G.C., Shiao, W. (2015), Viral lysis and nanoflagellate grazing on prokaryotes: effects of short-term warming in a coastal subtropical marine system, *Hydrobiologia*, 751, 43-54.
5. Chung, C.C., Gong, G.C., Huang, C.Y., Lin, J.Y., Lin, Y.C. (2015), Changes in the *Synechococcus* Assemblage Composition at the Surface of the East China Sea Due to Flooding of the Changjiang River, *Microbial Ecology*, 70, 677-688.
6. Yeh, Y.C., Peres-Neto, P.R., Huang, S.W., Lai, Y.C., Tu, C.Y., Shiah, F.K., Gong, G.C., Hsieh, C.H. (2015), Determinism of bacterial metacommunity dynamics in the southern East China Sea varies depending on hydrography, *Ecography*, 38, 198-212.
7. Liu, K.K., Yan, W.J., Lee, H.J., Chao, S.Y., Gong, G.C., Yeh, T.Y. (2015), Impacts of increasing dissolved inorganic nitrogen discharged from Changjiang on primary

production and seafloor oxygen demand in the East China Sea from 1970 to 2002, *Journal of Marine Systems*, 141, 200-217.

8. Chen, C.C., Hsu, S.C., Jan, S., Gong, G.C. (2015), Episodic events imposed on the seasonal nutrient dynamics of an upwelling system off northeastern Taiwan, *Journal of Marine Systems*, 141, 128-135.
9. Lui, H.K., Chen, C.T.A., Lee, J., Wang, S.L., Gong, G.C., Bai, Y., He, X.Q. (2015), Acidifying intermediate water accelerates the acidification of seawater on shelves: An example of the East China Sea, *Continental Shelf Research*, 111, 223-233.
10. Shih, Y.Y., Hung, C.C., Gong, G.C., Chung, W.C., Wang, Y.H., Lee, I.H., Chen, K.S., Ho, C.Y. (2015), Enhanced particulate organic carbon export at eddy edges in the oligotrophic Western North Pacific Ocean, *PLOS One*, 7, DOI: 10.1371/journal.pone.0131538.

PART 2 - Planned activities from 2016 to 2018/19

1. Planned major field studies and collaborative laboratory and modelling studies, national and international (incl. all information possible, dates, locations, teams, work, etc.)

Promote second phase (2015.8-2018.7) of integrated project of “*Effects of Global Change on Ocean Biogeochemistry and Ecosystems in the Seas surrounding Taiwan in the Northwest Pacific (ECOBEST-II)*”.

There are three major research categories which are:

1. Marine and Atmospheric Physics,
2. Riverine and Atmospheric Nutrients,
3. Ocean Acidification.

2. Events like conferences, workshops, meetings, schools, capacity building etc. (incl. all information possible)

1. 2016 Taiwan Geosciences Assembly (TGA), 16 to 20 May, 2016, Taipei, Taiwan.
2. AOGS 13th Annual Meeting, “Effects Of Global Change On Marine Biogeochemistry And Ecosystem In Marginal Seas: A Session Tribute To Prof. K. K. Liu.” (Section OS6), 31 Jul to 5 Aug, 2016, Beijing, China.

3. Funded national and international projects / activities underway (if possible please list in order of importance and indicate to which part(s) of the SOLAS 2015-2025 science plan the activity topics relate – including the themes on ‘SOLAS science and society’ and ‘Geoengineering’)

Please kindly see Part 2 Section 1.

4. Plans / ideas for future projects, programmes, proposals national or international etc. (please precise to which funding agencies and a timing for submission is any)

Please kindly see Part 1 Section 2.

5. Engagements with other international projects, organisations, programmes etc.

N/A.

Comments